U.S. Plans X-Ray Defense Against Missile Warheads

Pentagon Aide Confirms New Strategy to Destroy Targets With Bursts From High-Altitude Thermonuclear Blasts

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WASHINGTON, May 9—Testimony by a Pentagon official confirmed today that the United States was developing a missile defense system that would use tremendous bursts of X-rays from thermonuclear explosions to destroy incoming missile warheads.

According to Congressional testimony by the Pentagon official, Dr. John S. Foster Jr., this recently adopted approach of using X-rays to destroy warheads at high altitudes has opened a new concept in missile defense.

It has also made it possible to develop an "area defense," according to Dr. Foster, who is Director of Defense Research and Engineering.

The wide destructive range of the X-rays, defense officials indicated, has greatly simplified the complex problem of intercepting and destroying ballistic missile warheads.

Thus, for high-altitude interception, it would no longer be necessary to aimm defensive missiles directly at the incoming warhead—a problem that has been compared with trying to hit a bullet with another bullet.

Because the destructive range of the X-Rays extends for several miles, a defensive missile need only be fired in the general vicinity of the incoming warheads.

Furthermore, it will be possible with relatively few defensive missiles to provide a "first-line" defense for all of the United States against small-scale missile attacks, such as might be launched by mainland China.

The concept of using X-rays to "kill" incoming warheads evolved out of the long-established principle that at high altitudes — roughly above 300,000 feet—about 80 per cent of

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the energy of a thermonuclear explosion is given off in the form of X-rays.

In the near vacuum of high altitudes, the X-rays travel for tremendous distances at the speed of light although their energy tends to diminish with distance.

If while still in their high-energy state, the X-rays hit a solid object, such as a warhead, they are quickly stopped and their electromagnetic energy is converted into thermal energy. The resulting surge of energy shatters the outer casing of the warhead and creates a shock wave that damages the interior mechanisms of the warhead.

Recent Speculation

There has been considerable speculation in recent months that the use of X-Rays was a key element in the Nike X missile defense system being developed by the United States.

The first official confirmation of this secret development was provided by Dr. Foster in recent testimony before the Disarmament subcommittee of the Senate Foreign Relations Committee.

In heavily censored testimony made public today by the subcommittee, Dr. Foster said "a change in the concept of the nuclear warhead" had permitted an "advance" in ballistic missile defenses "which made area defense feasible."

The change, he said, was to "a high-yield nuclear warhead" — a technical euphemism used by officials for a thermonuclear warhead with a yield measured in megatons, or millins of tons of TNT.

The fact that the thermonuclear warheads would depend upon X-rays for their destructive effect was brought out indirectly when Senator Albert Gore of Tennessee the subcommittee chairman, asked Dr. Foster to indicate "just what would be the kill radius from X-rays."

Dr. Foster's answer was deleted by Pentagon censors, but the Gore question was left in the published testimony because of the subcommittee's insistence that the Pentagon's authority should not extend to censorship of questions asked by Senators. From the subsequent statements by Dr. Foster, however, it was appparent that in his censored testimony he had been talking about a "kill radius" from X-rays measured in miles.

United States weapons experts believe the Soviet Union is employing the same X-ray principle in the ballistic missile defense system that it has now started deploying around Moscow.

At one point in his testimony, Dr. Foster talked guardedly about how the United States was taking steps to "harden" its ballistic missile warheads.

The effect of such structural "hardening" would be to reduce the vulnerability of the warheads to the shock of X-rays. But it results in increased weight that reduces the explosive yield of the warhead.

As a result, Dr. Foster explained to the subcommittee, the Pentagon shifted toward the concept of providing "area defense" by using larger warheads, which with their X-ray effect would only have to be exploded in the general vicinity of the incoming warheads.

To carry the larger warhead, the Pentagon is developing the Spartan, a three-stage, 35,000-pound missile that will replace the Nike Zeus.

The Spartan missile, Dr. Foster testified, will intercept incoming warheads "well above the atmosphere" and can be directed at targets "several hundred miles" from the launching site.

Mr. Vance re-emphasized the position taken by Defense Secretary Robert S. McNamara and the Administration that a ballistic missile defense system was of questionable military value against the Soviet Union and that no decision should be taken on deployment of such a system pending the outcome of the current negotiations with the Soviet Union for a "freeze" on offensive and defensive missiles.

At the same time, Mr. Vance left open the possibility that it might be desirable to deploy a limited system as a deterrent against a Chinese missile attack.

In effect, the Spartan missiles would provide the first line of defense in halting incoming warheads. The terminal defense would be provided by Sprint missiles, which would be fired at warheads that penetrate the Spartan system and enter into the atmosphere.

One of the values of the Spartan system, according to the Foster testimony, is that it can provide a "thin defense" against an unsophisticated, small-scale missile attack, such as m ainland China might be capable of launching in the coming decade.

Mainland China has already tested an intermediate-range ballistic missile with a nuclear warhead and is expected to test the first stage of an intercontinental ballistic missile this summer.

One of the values of the Spartan system, Dr. Foster testified, is that "each Spartan battery can defend a fairly large area" and "comparatively few Spartan batteries can defend the whole United States from simple attacks."

The cost of deploying a Spartan system that would defend the United States against a relatively small attack was estimated by Dr. Foster at $4-billion.

Estimates supplied to the subcommittee by Deputy Defense Secretary Cyrus S. Vance showed that such a system was expected to provide "a high degree of protection" against any Chinese missile attack.